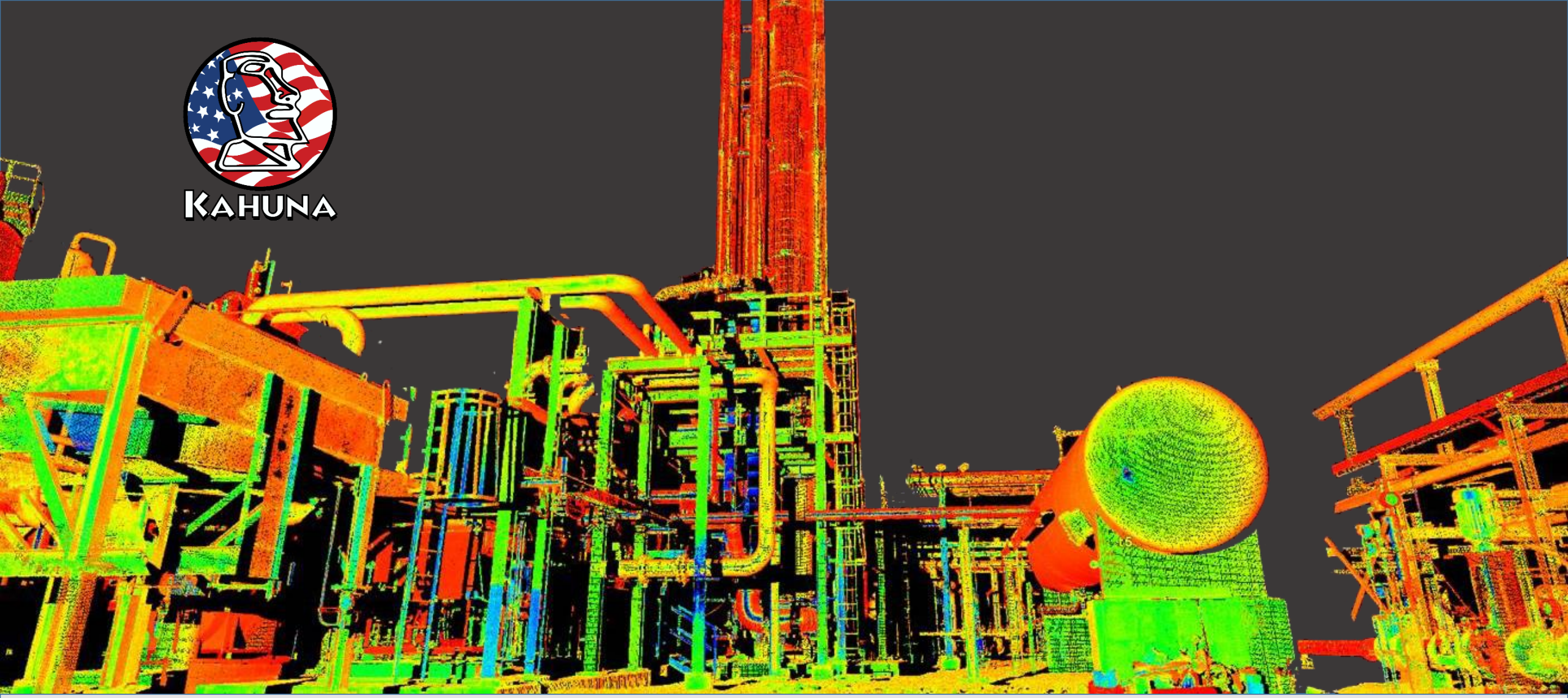


Using Light Detection and Ranging (LiDAR) for Facility Compliance Mapping

A Brief Introduction

Scope of Services

- PFD’s and P&ID’s
- Plant As Built Drawings
- Design On-Site Walk-Throughs
- Piping Sections & Isometrics
- Civil and Structural Design
- Electrical and Instrumentation
- 3D Facility Modeling
- 3D Piping

- 3D Laser Scanning of Existing Facilities
- Detailed Material List for Bid & Construction
- Pipeline GIS and System Maps
- Plot Plan
- Mapping & Alignment Services
- Document Management Consulting

KAHUNA

The Incentive

Asset Ages

Federal Government

Environment Protection Agency

State and Local Municipality

KAHUNA

Case Studies

Ways to adapt technology to meet the needs of producers

Aerial Imagery

+

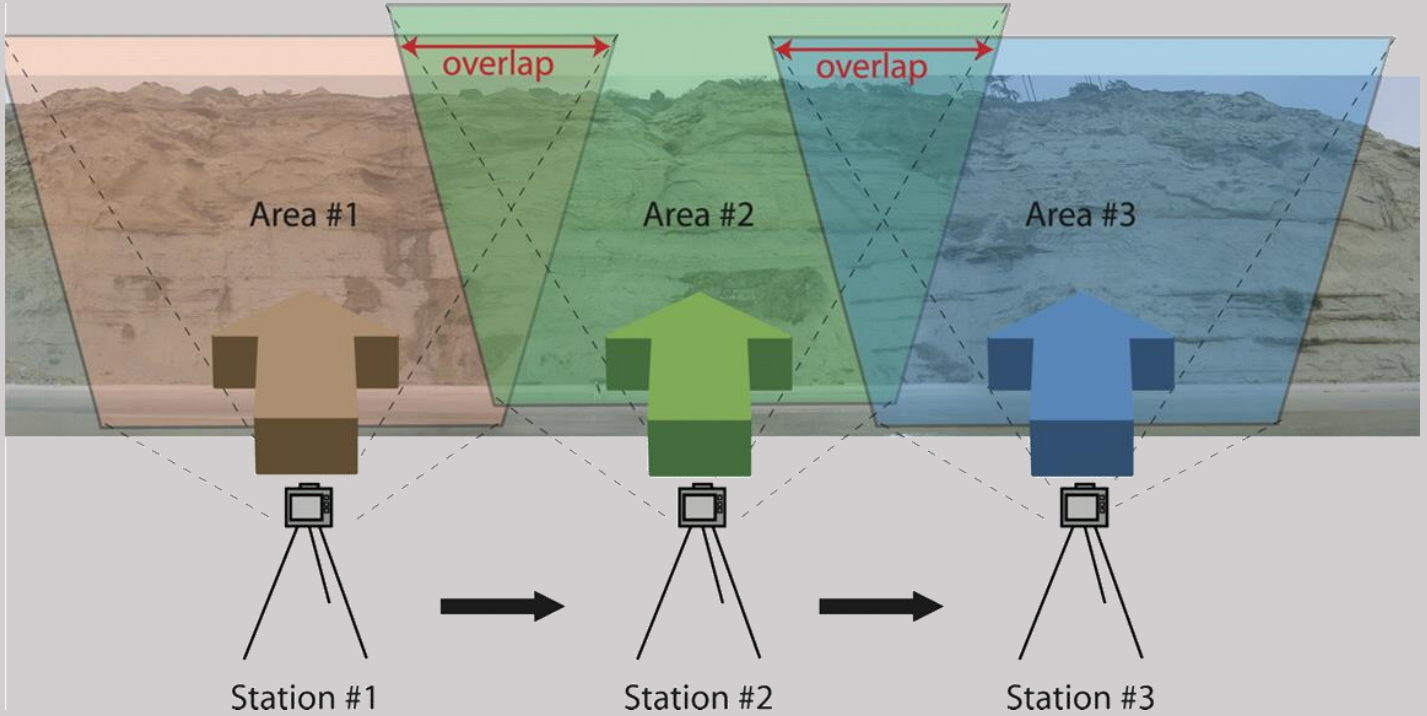
Laser Scanning

=

KAHUNA

What is Laser Scanning & LiDAR

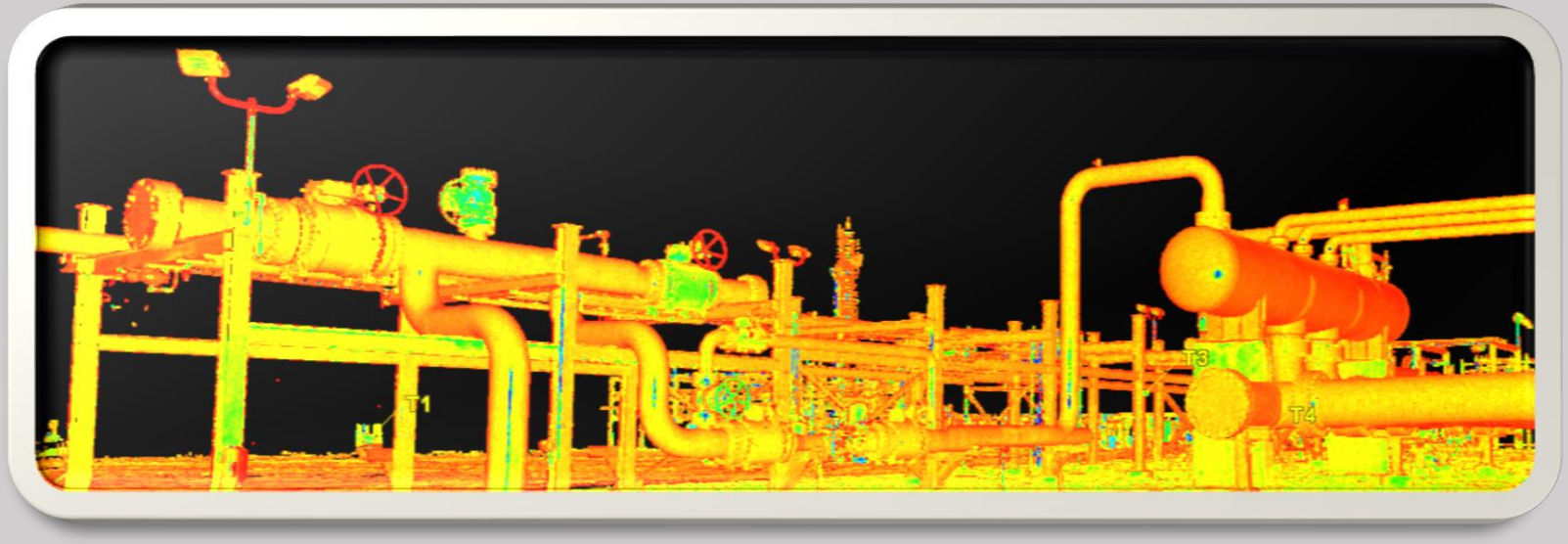
- Light Detection and Ranging (LiDAR)
- Analogous to RADAR, but using a different part of the electromagnetic spectrum.
- LiDAR uses the laser to illuminate a target and then analyzes the reflection.
- The narrow laser beam makes it possible to map objects with a high degree of resolution.



KAHUNA

3D Scanning/ LiDAR

- A remote technology that measures the distance by illuminating a target with a laser and analyzing the reflected light.
- Developed in the 1960's - NASA used Lidar to map the surface of the moon during the Apollo 15 mission in 1971.
- Only within the last 10 years has LiDAR/ 3D scanning started to become accepted and used in commercial industries.
- In AutoCAD 2013 point clouds were first able to be imported, and in AutoCAD 2017 point clouds are now fully utilized.



KAHUNA

Laser Scanning Case Study

Purchased Assets

What and Why

- Purchased Production Assets and Missing Documentation.
- Internally the client is committing to a safer work environment for employees and contractors.
  - Identify hazardous areas and produce site specific documentation.

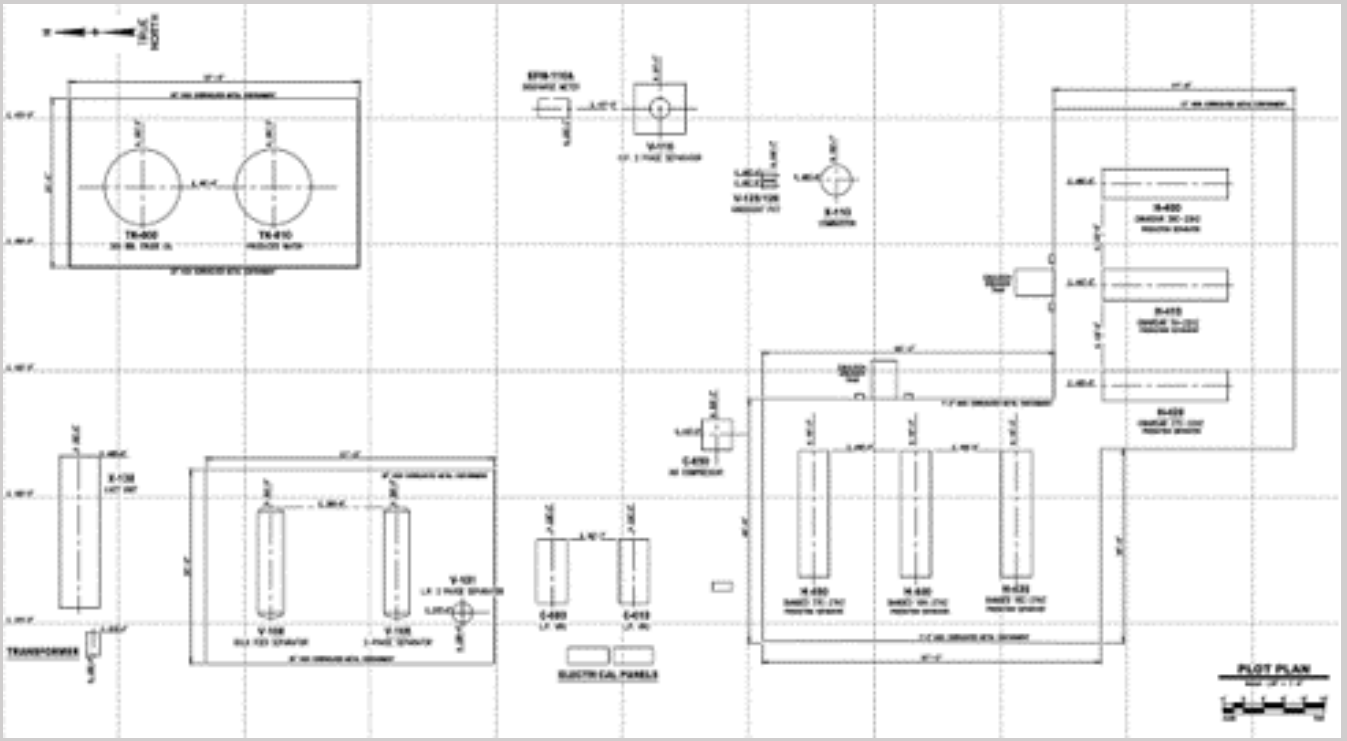
KAHUNA

Laser Scanning Case Study

Why Laser Scanning was the Best Option

Meeting Most Needs

- Plot Plan
- Equipment Models and Information
- Piping Models
- Electrical Area Classifications
- SPCC Plan
  - Potentially P&IDs



KAHUNA

Laser Scanning Case Study

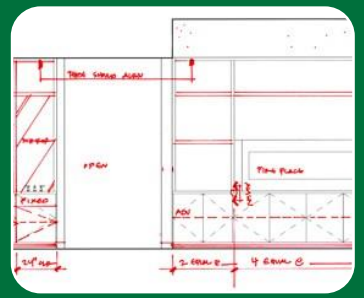
Laser Scanning vs. Other Methods

Deliverables

- Plot Plan, Electrical Area Classification, 3D CAD Model, As – Built Grading Information.

Field and Office Time (One Person)

- Laser Scanning- 3 Production sites per day Field Time, 5 sites finished per week.
- Conventional Method – 2 Days per site, 1 site finished per week.



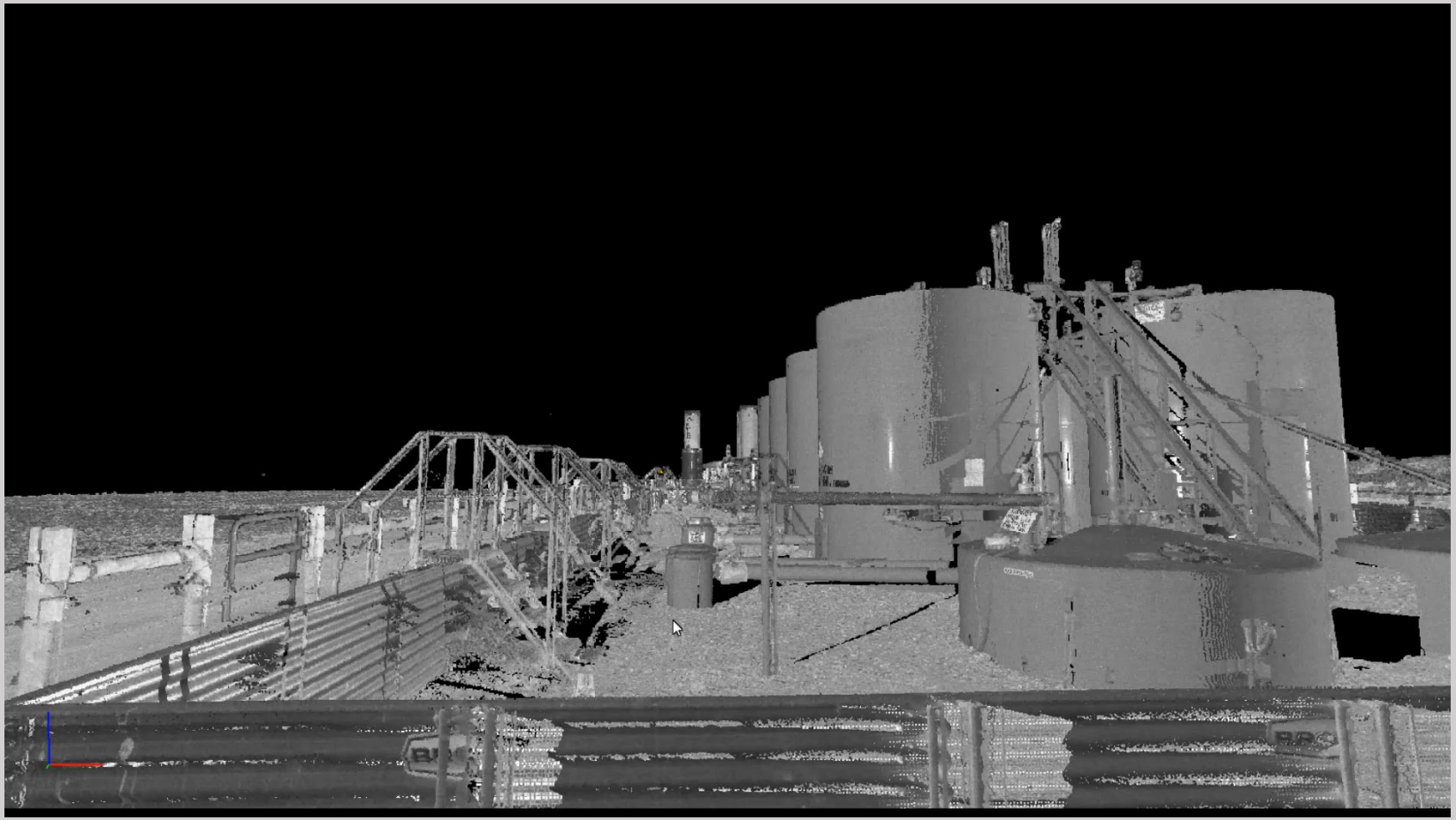
Accuracy

- Laser Scanning – Within ¼” without missed information
- Conventional Method – Within 1” and commonly missed vital information.

KAHUNA

Laser Scanning Case Study

Demo



KAHUNA

Aerial Imagery Case Study

Cost Effective Methods of Generating Information

Drone

- Weather Dependent
- 6” Accurate
- Requires Contractor

Google

- Very Inexpensive
- Imagery can be years out of date.
- 3’ Accuracy
- No Contractor Required

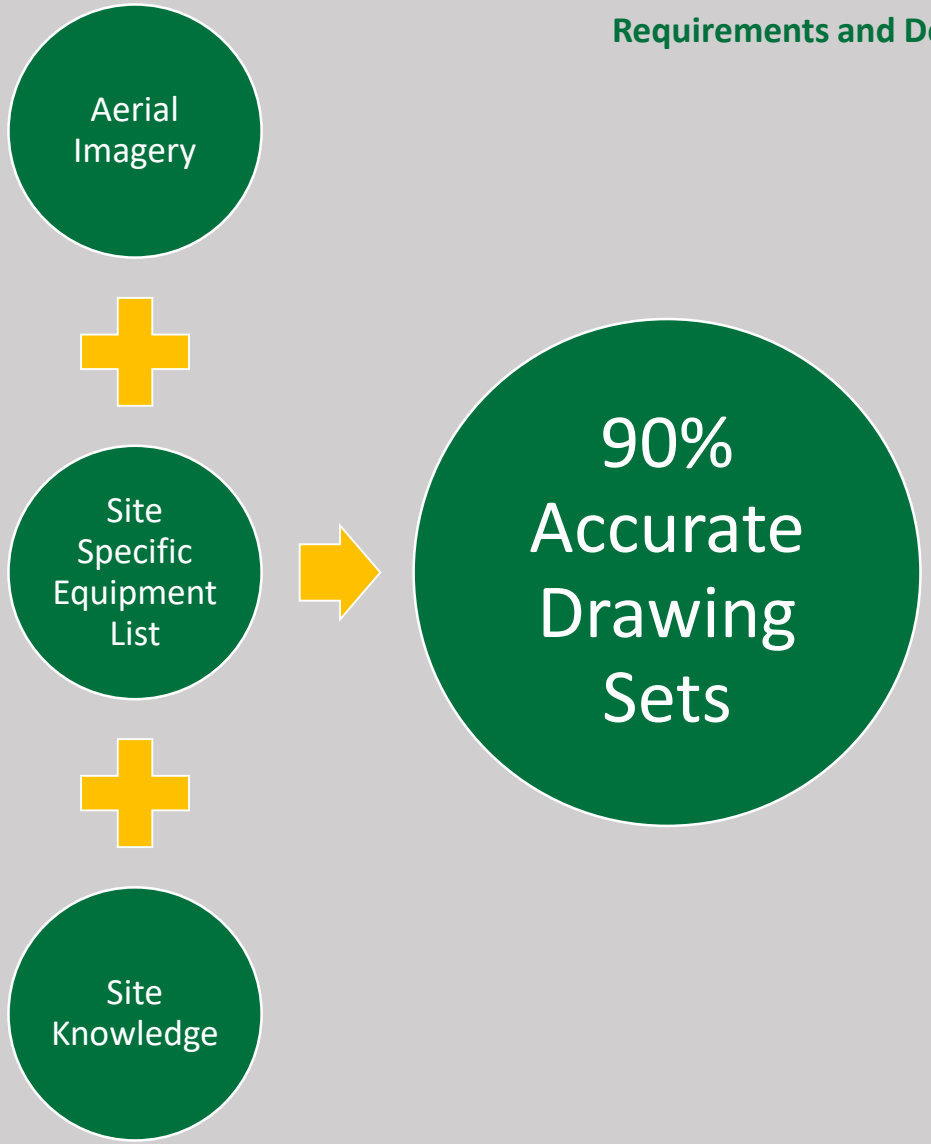
Satellite

- 6” - 3’ Accuracy Dependent of Cost
- No Contractor Required
- Range of Prices

KAHUNA

Aerial Imagery Case Study

Requirements and Deliverables



Plot Plans
Electrical Area Classifications
Generic P&ID Packages

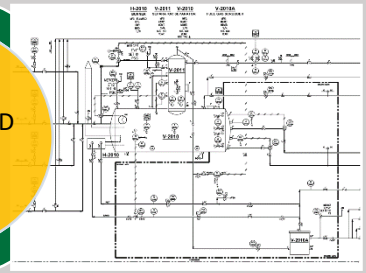
KAHUNA

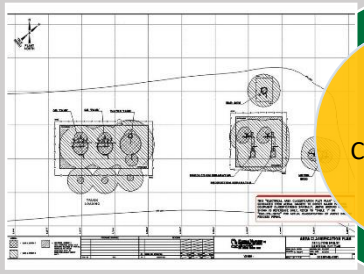
Aerial Imagery Case Study

What is Possible

Google Imagery

Generic P&ID Packages





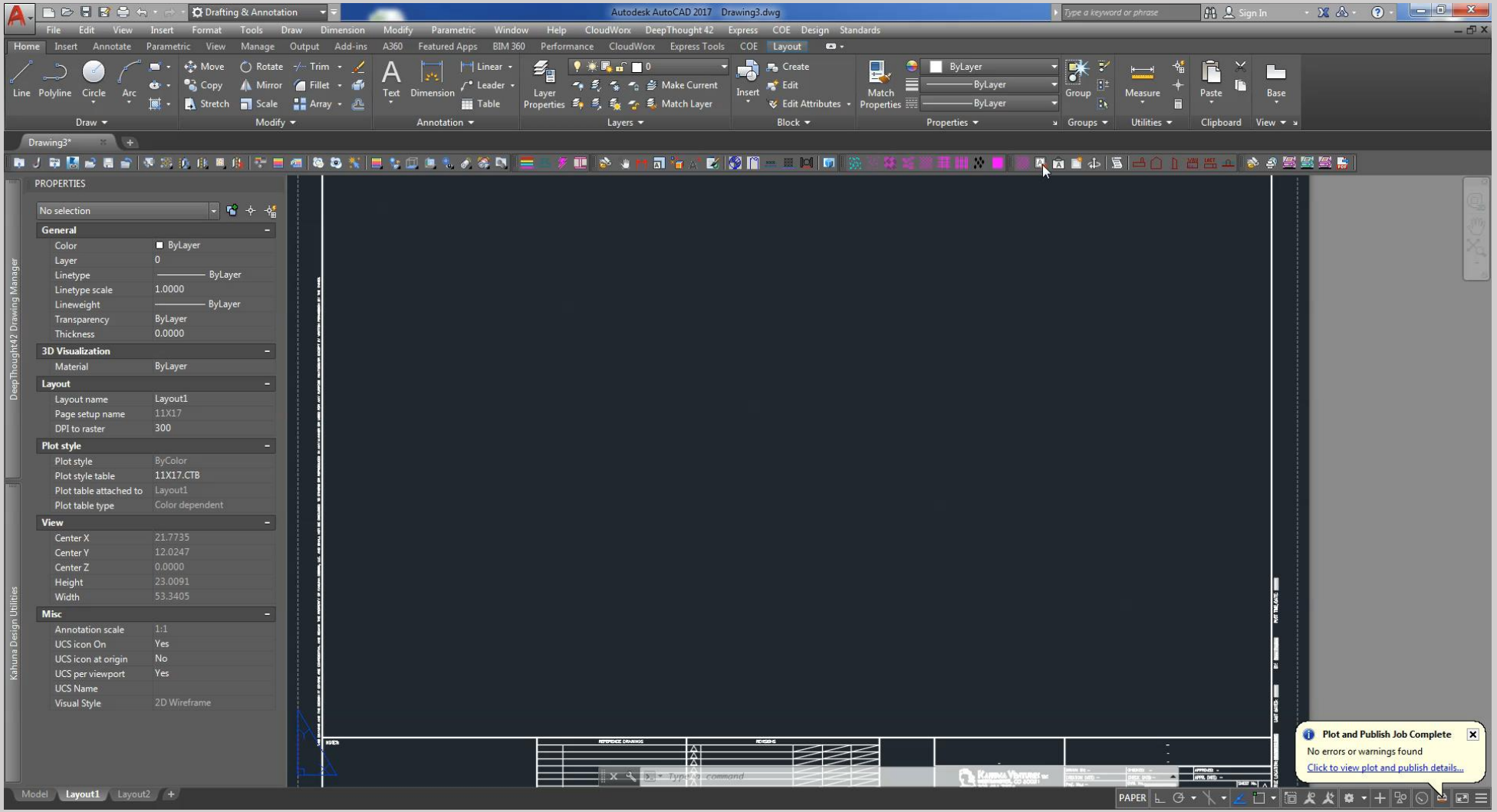
Area Classifications

After establishing typical drawings Generic P&IDs can be rapidly generated Area Classifications

KAHUNA

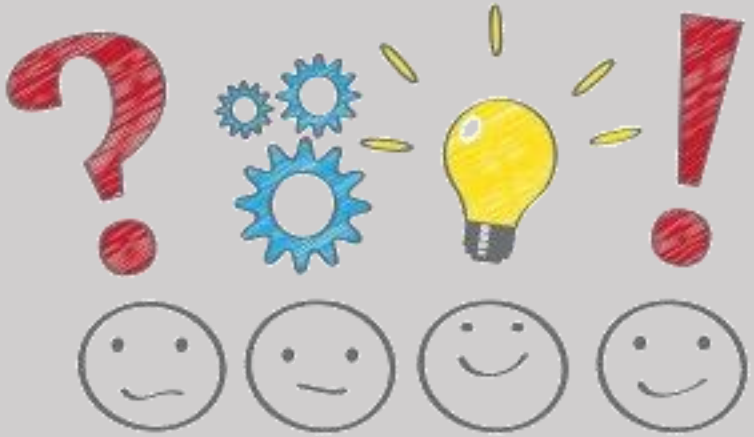
Aerial Imagery Case Study

Demo



KAHUNA

Questions



CONTACT:

Matt Anderson — Manager of Laser Scanning
303-407-3124 (Direct)
720-840-8844 (Cell)
MAnderson@KahunaUSA.com

Mike Phillips — Vice President, Design & Drafting
720-889-9989 (Direct)
303-475-5123 (Cell)
MPhillips@KahunaUSA.com

www.KahunaUSA.com

KAHUNA